[redacted] 25X1

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April 21, 1950

[redacted] 25X1 25X1

Ref: Contract RD-1

Sir:

We submit herein our proposal for funds to permit the orderly completion of the development phase of the subject contract.

1. Final performance data was not obtained from a model taken to Washington, as we and the engineer at [redacted] had agreed this was to be primarily a demonstration to show the feasibility of this type of power generation, and no provisions were made to measure fuel consumption, water rate, H.P. developed, or other pertinent technical information which would be of real interest to future designers in this field. 25X1

2. A testing program which would cost relatively little compared to the cost of the entire contract, could provide accurate data which would enable qualified engineers to predict the performance of small steam engines of this type in the 1/4 to 1-1/2 H.P. field. These data would enable an accurate forecast of all items mentioned above, plus weight, size, speed and other pertinent data.

3. It is not possible to find technical design data for steam engines in this H.P. range in any known available literature. We spent a good deal of time and money trying to do this without success. It is believed that the proper presentation would be a substantial addition to the available literature on steam power generation. Certainly it would enable the [redacted] and other Government agencies to properly evaluate the merits of small steam power plants. 25X1

4. This project is considered by us to have been successfully carried out. Now that we have brought it to a successful conclusion, and since this work was done on public funds, we believe that it is only right to properly present the most significant phase of the work - the basic information obtained during the course of the contract - by the preparation of a comprehensive final report.

This final report would include the following:

A. Accurate technical data as outlined in paragraph 2 above.

B. Recommended specifications for several power plants under varying conditions.

C. Data which will enable price determinations for various designs. This can probably best be done in the form of curves whose values can be transposed into a suitable simple formula.

The above data will enable the Government to arrive at the "ideal" specifications for the development of the final unit to be made under this program.

We also request permission to discuss this project with qualified and cleared personnel of other Government agencies with the understanding that your agency will not be mentioned in any discussion or communication.

We estimate that the cost of preparing this report will be under $4,000.00. As of April 15, 1950 we have approximately $600.00 unexpended. Therefore, we request that the contract be increased by $3,000.00 to cover the preparation of a final report as stated above. We also request that the completion date be changed to July 31, 1950.

Enclosed is an outline of the work to be done to complete the tests and final report described above. This outline divides the work into eight Tasks and provides estimates of man-hours required for each. Also enclosed is a cost-breakdown sheet for this work.

Very truly yours,

25X1

Vice-President

JEC:fm
Enclosure

April 21, 1950

OUTLINE OF WORK

TASK I

Work on Apparatus

1. Dynamometer hookup.
2. External fuel supply.
3. Fuel pump cooling set-up.
4. Thermocouple hookups.
5. Run-bypass re-work.
6. Miscellaneous.

Estimated man-hours: Senior Engineer - 6 hours
Shop - 32 hours

TASK II

Test Program

1. Runs at 2200 r.p.m. and 600°-650°F. engine steam.

   a. No load
   b. 0.1 H.P.
   c. 0.2 H.P.
   d. 0.3 H.P.
   e. 0.4 H.P.
   f. 0.5 H.P.
   g. 0.6 H.P.
   h. 0.7 H.P.

2. Runs at 2200 r.p.m. and 400°-450°F. engine steam

   a. No load
   b. 0.2 H.P.
   c. 0.4 H.P.
   d. 0.6 H.P.

Estimated man-hours: Senior Engineer - 24 hours
Shop - 32 hours

TASK III

Calculation and Plotting of Performance Data Gathered during Task II.

Calculate:

1. Horsepower
2. Horsepower/cu.in./minute
3. Water consumption
4. Heat put into water
5. Heat extracted from steam

6. Fuel consumption
7. Boiler efficiency
8. Water rate, engine
9. Heat rate, engine
10. Thermal efficiency, engine
11. Brake m.e.p.
12. Overall thermal efficiency

Plot:
1. Water rate and heat rate vs. horsepower.
2. Water rate and heat rate vs. horsepower/cu.in./minute
3. Other significant data which may develop in course of final analysis.

Estimated man-hours: Senior Engineer - 34 hours
Junior Engineer - 16 hours

TASK IV

Preparation for Alcohol Burner Tests.

Estimated man-hours: Senior Engineer - 22 hours
Shop - 16 hours

TASK V

Test Run Using Alcohol Fuel.

Estimated man-hours: Senior Engineer - 22 hours
Shop - 16 hours

TASK VI

Basic Design Parameters for units of 1/4-1/2 H.P. and 1 H.P. based on data from Task III. Includes curves showing important characteristics. Outline design characteristics of units that would, in our opinion, be suitable.

Estimated man-hours: Senior Engineer - 60 hours.
Junior Engineer - 40 hours.

TASK VII

Quantity cost curves, based on Task VI.

Estimated man-hours: Senior Engineer - 24 hours.

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TASK VIII

Discussion of utilizing fuels other than alcohol and gasoline, including estimated effect on costs.

Recommendations for additional work in this field.

Cost in man-hours.

Estimated man-hours: Senior Engineer - 60 hours.

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COST BREAKDOWN

Senior Engineer, 252 hours		$1,305.60
Junior Engineer, 56 hours		126.00
Shop man 96 hours		144.00
Total Labor		1,575.60
Materials		100.00
Travel between [redacted] and remote location		165.60
Packaging, handling, and shipping final unit and other Government Property		500.00
Overhead at 75% of direct labor		1,181.70
	TOTAL	$3,522.90

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